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ABSTRACT:

PROBLEM TO BE SOLVED: To provide an image pickup unit excellent in the protective function of an imaging means, and which is small-sized, and whose power consumption is low, and which copes with the increase of the number of picture elements.

SOLUTION: Incident field light is image-formed on a specified image-formation surface by an image pickup optical system, and is photoelectrically converted and outputted by the image pickup means. This unit has blade members 4 and 5 arranged so as to be able to enter an image pickup optical path leading to the image pickup means from the image pickup optical system, and the blade members 4 and 5 are converted and driven between a first

state where they are retreated to the outside of the image pickup optical path and a second state where they enter the inside of the image pickup optical path by a blade driving means 6. Since the blade driving means 6 is constituted of, for instance, a moving magnet, and is held in a non-energizing state by a holding means, for instance, in iron pin or the like, power consumption in accordance with holding is eliminated even though the blade members 4 and 5 are

held at the most desirable position in accordance with a change in the state of a camera. Therefore, the power consumption is restrained even though the protection of the image pickup means and real image display or the like for a liquid crystal finder are performed, and also the exposure is completed by the blade members 4 and 5, so that the unit copes with the increase of the number of the picture elements.

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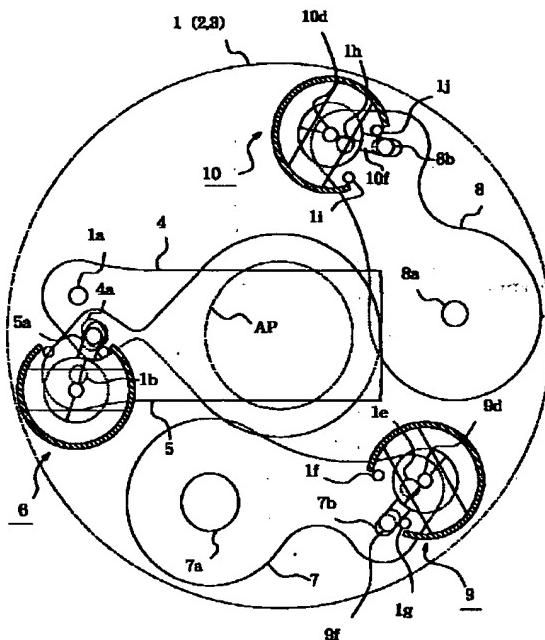
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(54)【発明の名称】 撮像装置

(57)【要約】

【課題】 撮像手段の保護機能が高く小型且つ低消費電力で画素数の増大にも対応できる撮像装置を提供する。
【解決手段】 入射した被写界光は撮像光学系11により所定の結像面に結像され、撮像手段12により光電変換出力される。撮影光学系11から撮像手段12に至る撮像光路中に進入可能に配置された羽根部材4、5を具備し、羽根部材4、5は羽根駆動手段6により撮像光路外に待避した第1状態と撮像光路内に進入した第2状態との間で変換駆動される。羽根駆動手段は例えばムービングマグネットで構成され、例えば鉄ピン1c、1d等の保持手段により非通電状態で保持されるので、カメラの状態変化に応じて羽根部材を最も望ましい位置で保持しても保持に伴う電力消費が無いので、撮像手段の保護や液晶ファインダへの実画像表示等を行っても電力消費が押されられ、又、羽根部材で露出を終了出来るので画素数の増大にも対応できる。



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【特許請求の範囲】

【請求項1】 入射光を所定の結像面に結像させる撮影光学系と、該撮影光学系により入射光が結像する結像面に配置される撮像手段と、前記撮影光学系から前記撮像手段に至る撮像光路中に進入可能に配置された羽根部材と、駆動電力が供給されることにより前記羽根部材を前記撮像光路外に待避した第1状態と前記撮像光路内に進入した第2状態との間で駆動する羽根駆動手段と、前記羽根駆動手段を非通電状態で前記第1状態又は前記第2状態で保持する保持手段と、を具備することを特徴とする撮像装置。

【請求項2】 請求項1記載の撮像装置において、前記羽根駆動手段は、電流の供給方向に対応して出力端が所定の角度範囲内で旋回するムービングマグネットで構成され、前記保持手段は、前記ムービングマグネットの旋回動作限に配置された強磁性体で構成されることを特徴とする撮像装置。

【請求項3】 入射光を所定の結像面に結像させる撮影光学系と、該撮影光学系により入射光が結像する結像面に配置される撮像手段と、前記撮影光学系から前記撮像手段に至る撮像光路中に進入可能に配置され、口径値を制御する1又は複数の絞り羽根部材と、駆動電力が供給されることにより前記絞り羽根部材を前記撮像光路外に待避した第1状態と前記撮像光路内に進入した第2状態との間で駆動する絞り羽根駆動手段と、前記撮影光学系から前記撮像手段に至る撮像光路中に進入可能に配置され、撮像光路を開閉するシャッタ羽根部材と、駆動電力が供給されることにより前記シャッタ羽根部材を前記撮像光路外に待避した第1状態と前記撮像光路内に進入した第2状態との間で駆動するシャッタ羽根駆動手段と、前記各々の羽根羽根駆動手段を非通電状態で前記第1状態又は前記第2状態で保持する保持手段と、を具備することを特徴とする撮像装置。

【請求項4】 請求項3記載の撮像装置において、前記撮像手段として電荷結合素子を有するとともに、該電荷結合素子に蓄積された電荷を放出した後、前記シャッタ羽根駆動部材が前記シャッタ羽根部材を前記第1状態から前記第2状態に駆動する迄の時間を制御することにより露出秒時を制御する露出制御手段を具備することを特徴とする撮像装置。

【請求項5】 請求項3又は請求項4記載の撮像装置において、前記シャッタ羽根駆動手段及び前記絞り羽根駆動手段は、電流の供給方向に対応して出力端が所定の角度範囲内で旋回するムービングマグネットで構成され、前記保持手段は、前記ムービングマグネットの旋回動作限に配置された磁性体で構成されることを特徴とする撮像装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は撮像装置に関し、よ

り詳細には所謂電子スチルカメラの様に被写体像を光電変換して静止画像得る撮像装置に関する。 .

【0002】

【従来の技術】近年被写体像を光電変換して静止画像を得る様にした撮像装置が所謂銀塩カメラとともにスチルカメラの1分野として普及しつつある。この種の撮像装置における露出制御としては、撮像手段のオンからオフ迄の時間を制御することによって露出秒時を制御する様にしたものも知られているが、動的な被写体を撮影する場合にはインターレースの影響で奇数ラインと偶数ラインとで時間的なズレが生じ、被写体の外形がギザギザが生じるという問題がある。又、最近ではこの様な問題を解決するためにノンインターレースでフルフレーム画像を出力できる様にした撮像素子も普及しつつあるが、ノンインターレースで画素数を多くした場合には素子自体が非常に高価なものとなり、画像データの取込中に撮像素子を被写界光から遮蔽するためにシャッタ装置を備える要望がある。又、スチル型の所謂電子カメラやデジタルビデオカメラの場合、銀塩フィルムカメラの様に現像所での

10 案場合にはインターレースの影響で奇数ラインと偶数ラインとで時間的なズレが生じ、被写体の外形がギザギザが生じるという問題がある。又、最近ではこの様な問題を解決するためにノンインターレースでフルフレーム画像を出力できる様にした撮像素子も普及しつつあるが、ノンインターレースで画素数を多くした場合には素子自体が非常に高価なものとなり、画像データの取込中に撮像素子を被写界光から遮蔽するためにシャッタ装置を備える要望がある。又、スチル型の所謂電子カメラやデジタルビデオカメラの場合、銀塩フィルムカメラの様に現像所での

20 露光補正が期待できず、露出許容度も銀塩フィルムよりも狭いので、較り口径とシャッタ秒時は単独で制御したいという要望がある。銀塩フィルムカメラの場合には単独のアクチュエータを絞り羽根とシャッタ羽根の駆動源として兼用する様にしたものが広く普及している。この様な機構は一般的にはアクチュエータの作動の第1段階で絞り機構を目的の位置迄駆動してラチエット等のラッチ機構によって絞り機構を係止した後にアクチュエータの作動の第2段階でシャッタ機構を開閉駆動する様になされている。

【0003】

【発明が解決しようとする課題】しかしながら、所謂電子スチルカメラは撮像素子面積が一般的な35ミリフィルムや新規格フィルム等の銀塩フィルムよりも格段に狭いのでレンズ鏡胴周囲を小型化する一方でレンズ口径のみは大口径を維持したいという要望が強く、羽根駆動機構の実装スペースが狭小化する傾向にあり、上述の様に単独のアクチュエータを絞り機構とシャッタ機構の駆動源として兼用する場合には、動力の伝達系が複雑になるとともに絞り機構を係止する係止機構や係止解除機構も

30 設けなければならないため、実装が困難となるという問題もある。

【0004】この問題を解決するためには、絞り機構とシャッタ機構双方に独立したアクチュエータを設けるとともに、各々の羽根を各々のアクチュエータでダイレクト駆動することが有効である。ところで、電子カメラの場合、カメラの非使用時には撮像手段を被写界光から保護するためにはシャッタ羽根を閉鎖状態にする所謂ノーマルクローズタイプが望ましい一方で電源の投入時には例えば液晶ファインダ等のモニタ装置に被写体像を写し出すためにシャッタをオープン状態で維持したいという

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要望があるが、電源の投入時にシャッタ羽根を開口位置で維持するために電流を供給し続けた場合、電源の消耗が著しいという問題が生じる。特に、電子カメラの場合、銀塩カメラと比較してカメラサイズが小型化されるとともにファインダの表示や画像記録等にも電力を消費するので、電源の消耗を極力抑制したいという要望が強い。

【0005】

【課題を解決するための手段】本発明はこの様な問題点に鑑みてなされたものであり、シャッタ周辺を小型化でき、撮像素子の保護と液晶ファインダの表示を可能としながら電力消費の少ない撮像装置を提供することを目的とする。要約すれば、本発明の請求項1に係る撮像装置は：入射光を所定の結像面に結像させる撮影光学系と：該撮影光学系により入射光が結像する結像面に配置される撮像手段と：前記撮影光学系から前記撮像手段に至る撮影光路中に進入可能に配置された羽根部材と：駆動電力が供給されることにより前記羽根部材を前記撮像光路外に待避した第1状態と前記撮像光路内に進入した第2状態との間で駆動する羽根駆動手段と：前記羽根駆動手段を非通電状態で前記第1状態又は前記第2状態で保持する保持手段と：を具備することにより上記目的を達成する。

【0006】請求項2に係る撮像装置は請求項1を前提として：前記羽根駆動手段は、電流の供給方向に対応して出力端が所定の角度範囲内で旋回するムービングマグネットで構成され：前記保持手段は、前記ムービングマグネットの旋回動作限に配置された強磁性体で構成される。

【0007】更に、請求項3に係る撮像装置は：入射光を所定の結像面に結像させる撮影光学系と：該撮影光学系により入射光が結像する結像面に配置される撮像手段と：前記撮影光学系から前記撮像手段に至る撮影光路中に進入可能に配置され、口径値を制御する1又は複数の絞り羽根部材と：駆動電力が供給されることにより前記絞り羽根部材を前記撮影光路外に待避した第1状態と前記撮影光路内に進入した第2状態との間で駆動する絞り羽根駆動手段と：前記撮影光学系から前記撮像手段に至る撮影光路中に進入可能に配置され、撮影光路を開閉するシャッタ羽根部材と：駆動電力が供給されることにより前記シャッタ羽根部材を前記撮影光路外に待避した第1状態と前記撮影光路内に進入した第2状態との間で駆動するシャッタ羽根駆動手段と：前記各々の羽根羽根駆動手段を非通電状態で前記第1状態又は前記第2状態で保持する保持手段と：を具備することにより上記目的を達成する。

【0008】請求項4に係る撮像装置は：請求項3を前提として：前記撮像手段として電荷結合素子を有するとともに：該電荷結合素子に蓄積された電荷を放出した後、前記シャッタ羽根駆動部材が前記シャッタ羽根部材

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を前記第1状態から前記第2状態に駆動する迄の時間を制御することにより露出秒時を制御する露出制御手段を具備することを特徴とする撮像装置。

【0009】請求項5にかかる撮像装置は、請求項3又は請求項4を前提として：前記シャッタ羽根駆動手段及び前記絞り羽根駆動手段は、電流の供給方向に対応して出力端が所定の角度範囲内で旋回するムービングマグネットで構成され：前記保持手段は、前記ムービングマグネットの旋回動作限に配置された磁性体で構成されてい

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る。

【0010】即ち、本発明によれば、撮影光学系から撮像素子に至る撮像光路中に進入可能に配置された羽根部材を有するので、不使用時における撮像手段の保護がなされるとともに撮像手段の画素数の増加も容易に行え、しかも、非通電時においても羽根部材が撮影光路外に待避した状態或いは撮影光路内に進入した状態で羽根駆動部材は保持手段によって保持されるので、無駄な電力消費が抑制される。

【0011】

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【発明の実施の形態】以下図面を参照して本発明の実施形態を説明する。図1は本発明の撮像装置がカメラ本体側の電源がオフした状態を示す平面図であり、図2はムービングマグネットの周辺を示す断面図である。図中1は上地板、2は中地板、3は下地板であり、図1においては上地板1、中地板2、下地板3は同一の一点鎖線で仮想的に示している。これらの地板類の中央部分には撮像光路を形成する露出開口APが形成されている。

4、5は露出開口APを開閉するシャッタ羽根であり、シャッタ羽根4、5は上地板1の裏面に植設されたピン

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1a、1bに対して各々摆動自在に支持されている。尚、本実施例に示すシャッタ羽根4、5はアバーチュア形成縁は有しておらず、不使用時には露出開口APを遮蔽した状態にある。

【0012】次に、6はシャッタ羽根4、5を開閉駆動するためのムービングマグネットであり、図2は断面を、図3は図1に示す平面を拡大して各々示している。尚、ムービングマグネット6の構成要素の符号は図1には特に示さないが、図2及び図3を参照すれば理解される。ムービングマグネット6は円筒状のケーシング6aの内法にコイル棒6bが固定されており、コイル棒6bの長手方向に沿って図3に示す様にコイル6cが巻き付けられている。コイル棒6bの内側に設けられた軸6dには2極のマグネット6eが回転可能に支持され、マグネット6eの外側に突出形成された出力ピン6fは上地板1及び中地板2を貫通してシャッタ羽根4、5に各々形成された長孔4a、5a(図1参照)と各々係合している。

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【0013】出力ピン6fの作動範囲は上地板1に植設された例えば鉄等の強磁性体で形成されたピン1c、1dによって規制されている。初期状態では出力ピン6f

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はピン1cを磁着して図1や図3に示す状態で保持されているが、この状態でコイル6cに正のパルス電流を供給するとコイル棒6bの周辺には図3において上側がN極になる磁界が形成され、マグネット6eは軸6dを中心反時計回りに回転し、出力ピン6fがピン1dに当接して停止する。そして出力ピン6fはピン1dを磁着するので、正のパルス電流の供給を遮断しても、出力ピン6fはピン1dを磁着した状態で保持される。又、出力ピン6fがピン1dを磁着した状態からコイル6cに対して負のパルス電流を供給するとコイル棒6bの周辺には図3において下側がN極になる磁界が形成されるので、マグネット6eは軸6dを中心に時計回りに回転し、出力ピン6fがピン1cに当接して停止する。そして出力ピン6fはピン1cを磁着するので、負のパルス電流の供給を遮断しても、出力ピン6fはピン1cを磁着した状態で保持される。

【0014】本実施形態は大中小の三種類の口径制御を行ふ様にしたものと想定しており、露出開口APの全開状態が大口径に相当する。又、中口径及び小口径は絞り羽根7又は8を露出開口APに各々進入させることによって得ている。先ず、中口径に対応した絞り羽根7は上地板1に植設されたピン1eに懸垂自在に支持されており、絞り羽根7の先端部分には中口径に相当する開口7aが形成されている。又、9は絞り羽根7を旋回させるための駆動源となるムービングマグネットであり、ムービングマグネット9の構成は既に説明したムービングマグネット6と基本的に同様であり、出力ピン9fが絞り羽根7に形成された長孔7bと係合している。尚、本実施形態においては、ムービングマグネット9は、正のパルス電流を供給することによって出力ピン9fが強磁性体のピン1fに当接するまで軸9dを中心に時計回りに回転し、負のパルス電流を供給することによって強磁性体のピン1gに当接するまで軸9dを中心に反時計回りに回転する。又、絞り羽根7に形成された開口7aはムービングマグネット9の出力ピン9fがピン1fに当接した状態の時に開口7aと露出開口APが概ね同心円になる。

【0015】次に、小口径に対応した絞り羽根8は上地板1に植設されたピン1hに懸垂自在に支持されており、絞り羽根8の先端部分には小口径に相当する開口8aが形成されている。又、10は絞り羽根8を旋回させるための駆動源となるムービングマグネットであり、ムービングマグネット10の構成も既に説明したムービングマグネット6と基本的に同様であり、出力ピン10fが絞り羽根8に形成された長孔8bと係合している。尚、本実施形態においては、ムービングマグネット10は、正のパルス電流を供給することによって出力ピン10fが強磁性体のピン1iに当接するまで軸10dを中心に時計回りに回転し、負のパルス電流を供給することによって強磁性体のピン1jに当接するまで軸10dを

6

中心に反時計回りに回転する。又、絞り羽根8に形成された開口8aはムービングマグネット10の出力ピン10fがピン1iに当接した状態の時に開口8aと露出開口APが概ね同心円になる。

【0016】次に、図4は本実施形態の制御系のブロック図であり、4、5は既述のシャッタ羽根4、5を示し、7、8は既述の絞り羽根7、8を示し、6、9、10は既述のムービングマグネット6、9、10を各々示している。又、11は撮影用のレンズ、12は撮像手段たるCCD、13はCCD12から出力された画像信号の記憶処理等を行う画像信号処理回路、14はシャッタレリーズスイッチ、15はメインスイッチ、16はマイクロコンピュータを各々示す。又、17はシャッタ駆動用のムービングマグネット6に駆動信号を供給するシャッタ駆動回路、18は絞り駆動用のムービングマグネット9及びムービングマグネット10に駆動信号を供給する絞り駆動回路、19はCCD12の電荷蓄積及び電荷放出を制御する電子シャッタ制御回路を各々示す。

【0017】次に、上記事項、図5のフローチャート、図6のタイムチャート、図7及び図8の状態変化を示す平面図を参照して本実施形態の動作を詳細に説明する。先ず、初期状態において機構は図1に示す状態にある。メインスイッチ15がオンすることによりプログラムはスタートし、マイクロコンピュータ16は電子シャッタ制御回路19を制御してCCD12を作動開始させるとともにシャッタ駆動回路17を制御してムービングマグネット6に対して正のパルス電流を供給させる。(ステップS2、S3)

【0018】ムービングマグネット6に対して正のパルス電流が供給されることによって出力ピン6fは軸6dを中心にしてピン1dに当接するまで反時計回りに回転する。そして、出力ピン6fがピン1dに当接すると出力ピン6fはピン1dを磁着するので、正のパルス電流が立ち下がった後の非通電状態でも出力ピン6fの位置は保持される。この様にして図1に示す状態から出力ピン6fが反時計回りに回転すると、ピン6fは長孔4a、5aを各々係合しているので、シャッタ羽根4は軸1aを中心に左旋し、シャッタ羽根5は軸1bを中心に右旋して露出開口APを開口する。尚、図7及び図8はシャッタ羽根4、5が露出開口APを開口した状態を示している。

【0019】さて、CCD12は既に作動を開始しているので、上記の様にしてシャッタ羽根4、5が露出開口APを開口してCCD12が被写界光に露呈されると、CCD12の出力はマイクロコンピュータ16に加えられる。そしてマイクロコンピュータ16はCCD12の出力によって被写界輝度を測定し、適正な絞り値とシャッタ秒時を算出し、レリーズスイッチ14がオンするのを待つ(ステップS4)。そしてレリーズスイッチ14がオンするとステップS4で算出した絞り値に応じて処

理を分岐する（ステップS9）。

【0020】使用される絞り値が中絞りの時にはマイクロコンピュータ16は絞り駆動回路18を制御してムービングマグネット9に正のパルス電流を供給し（ステップS10），ムービングマグネット9は出力ピン9fが軸9dを中心にピン1fに当接するまで右旋し，ピン1fを磁着するので，正のパルス電流が立ち下がった非通電状態でも右旋位置を保持する。そして，ムービングマグネット9の右旋動作に伴って絞り羽根7も軸1eを中心右旋して開口7aが露出開口APを中絞りまで絞り込む。尚，図7はこの様にして開口7aが露出開口APを中絞りまで絞り込んだ状態を示している。又，使用される絞り値が小絞りの時にはマイクロコンピュータ16は絞り駆動回路18を制御してムービングマグネット10に正のパルス電流を供給し（ステップS11），ムービングマグネット10は出力ピン10fが軸10dを中心にピン1iに当接するまで右旋し，ピン1iを磁着するので，正のパルス電流が立ち下がった非通電状態でも右旋位置を保持する。そして，ムービングマグネット10の右旋動作に伴って絞り羽根8も軸1hを中心に右旋して開口8aが露出開口APを小絞りまで絞り込む。

尚，図8はこの様にして開口8aが露出開口APを小絞りまで絞り込んだ状態を示している。更に，使用される絞り値が大絞りの場合には，口径の絞り込み動作はなされず，直ちにステップS12に移行する。即ち，この場合には露出開口APの口径がそのまま絞り値になる。

【0021】この様にして口径値が定まるとマイクロコンピュータ16は電子シャッタ制御回路19を制御してCCD12の蓄積電荷を放出させる（ステップS12）。そしてCCD12は放電動作が完了した時点から再度電荷の蓄積を開始し，従って，このタイミングが有効露出秒時の開始タイミングになる。適正な露出秒時はステップS4で既に算出されているので，マイクロコンピュータ16はステップS12でCCD12の蓄積電荷を放出した後にステップS4で算出された露出秒時が経過するとシャッタ駆動回路17を制御してムービングマグネット6に負のパルス電流を供給する（ステップS14）。ムービングマグネット6に対して負のパルス電流が供給されることによって出力ピン6fは軸6dを中心にしてピン1cに当接するまで時計廻りに回転する。そして，出力ピン6fがピン1cに当接すると出力ピン6fはピン1cを磁着するので，負のパルス電流が立ち下がった後の非通電状態でも出力ピン6fの位置は保持される。この様にして図7又は図8に示す状態から出力ピン6fが時計廻りに回転すると，シャッタ羽根4が軸1aを中心に左旋するとともにシャッタ羽根5が軸1bを中心に右旋して露出開口APを遮蔽する。従って，開口径が露出開口APで定まる大口径撮影の場合には図6におけるハッチング部分ABCの合計面積が有効露光量に相当し，開口径が絞り羽根7の開口7aで定まる中口径

撮影の場合には図6におけるハッチング部分BCの合計面積が有効露光量に相当し，開口径が絞り羽根8の開口8aで定まる小口径撮影の場合には図6におけるハッチング部分Cの面積が有効露光量に相当することになる。

- 【0022】この様にしてシャッタ羽根4，5が露出開口APを遮蔽するとマイクロコンピュータ16は画像信号処理回路13を制御してCCD12の出力を取り込ませ（ステップS15），画像信号処理回路13は画像信号を例えば外部のメモリカード等の記憶装置に書き込み1回の撮影動作を完了する。この様にして一回の撮影動作が完了するとマイクロコンピュータ16は次の様にして次駒の撮影に備える。即ち，マイクロコンピュータ16はステップS16で絞り羽根7又は8を使用したか否かを判別する。そして，絞り羽根7が使用されていればムービングマグネット9に，又，絞り羽根8が使用されていればムービングマグネット10に各々負のパルス電流を加えて，絞り羽根7又は絞り羽根8を各々図1に示す初期状態に復帰させた後に（ステップS17），ステップS3に復帰してシャッタ羽根4，5を開口させてステップS8でレリーズスイッチ14がオンするのを待機する。尚，ムービングマグネット9や10は負のパルス電流の停止後も出力ピン9f，10fとピン1g，1jとの間の磁着力によって図1の状態を保持することはいうまでもない。又，この様にしてレリーズスイッチ14がオンするのを待機している間に電源スイッチ15がオフしたことをステップS5で検出するとステップS6でシャッタ駆動回路17を制御してムービングマグネット6に負のパルス電流を加え，シャッタ羽根4，5を閉鎖駆動して露出動作を終了する。尚，電源スイッチ15がオフした後の制御動作は例えば図外のキャパシタ等の容量回路から電源供給されて実行される。

【0023】尚，上記ではシャッタ羽根と絞り羽根の双方を独立して備えるカメラに本発明を適用した例を示したが，本発明の思想は絞り羽根の駆動機構或いはシャッタ羽根の駆動機構に各々独立して適用することも可能である。

【0024】

- 【発明の効果】以上説明した様に本発明によれば，羽根部材を撮像光路外に待避した第1状態で保持する場合も撮像光路内に進入した第2状態で保持する場合も保持動作中の電力消費が生じないので，電源のオフ時には羽根部材を第2状態で保持することにより撮像手段の保護を図り，電源オンでレリーズスイッチが操作されることを待機している状態では羽根部材を第1状態で保持することにより液晶ファインダ等の使用を可能とし，更に羽根部材を第1状態から第2状態に駆動することにより撮像光路を機構的に遮光することにより露出動作を終了出来るので，画素数の増大にも有効に対応できる。そして，この羽根駆動に伴う電力消費は羽根位置を反転するときのみで保持動作のための電力消費が無いので，液晶

ファインダ駆動や画像データの書込など電力消費の大きな電子スチルカメラ等に撮像装置において全体として電力消費を減少させることが出来、撮影コマ数を増大させることが出来る。

【図面の簡単な説明】

【図1】本発明の実施例に係る撮像装置の初期状態における平面図。

【図2】図1に示すムービングマグネット6の断面図。

【図3】図1に示すムービングマグネット6の拡大平面図。

【図4】本発明の実施例に係る撮像装置の制御系のブロック図。

【図5】図4に示す制御系の制御動作示すフローチャート。

【図6】図4に示す制御系の動作タイミングを示すタイマチャート。

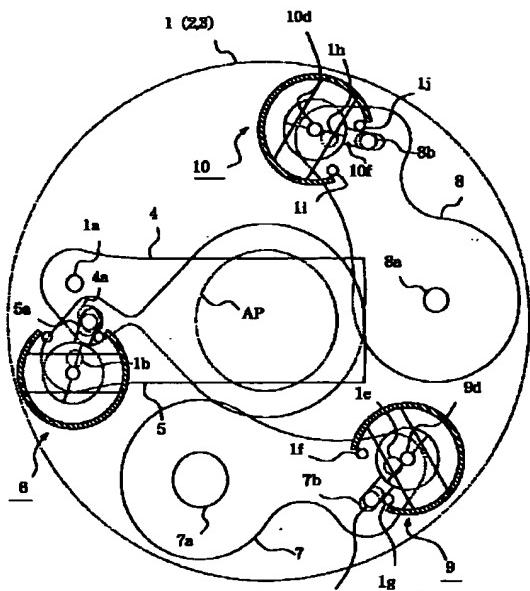
【図7】図1に示す実施例を中絞り状態にした平面図。

【図8】図1に示す実施例を小絞り状態にした平面図。

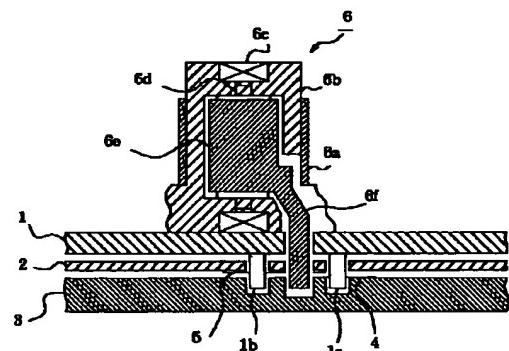
【符号の説明】

- 1 上地板
- 1c, 1d, 1f, 1g, 1i, 1j ピン
- 4, 5 シャッタ羽根
- 6 ムービングマグネット
- 6f 出力ピン
- 7 中絞り用絞り羽根
- 7a 開口
- 8 小絞り用絞り羽根
- 10 8a 開口
- 9 ムービングマグネット
- 9f 出力ピン
- 10 ムービングマグネット
- 10f 出力ピン
- 11 レンズ
- 12 CCD
- 16 マイクロコンピュータ
- AP 露出開口

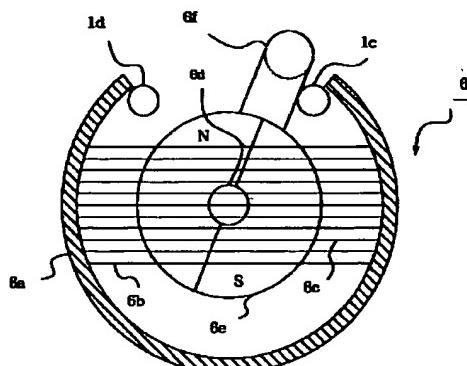
【図1】



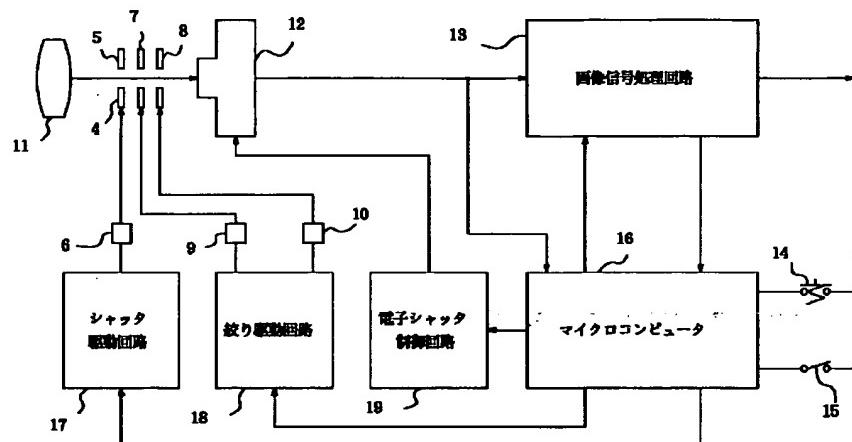
【図2】



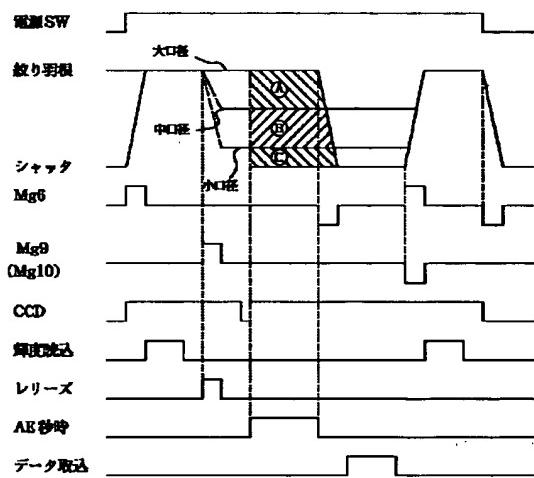
【図3】



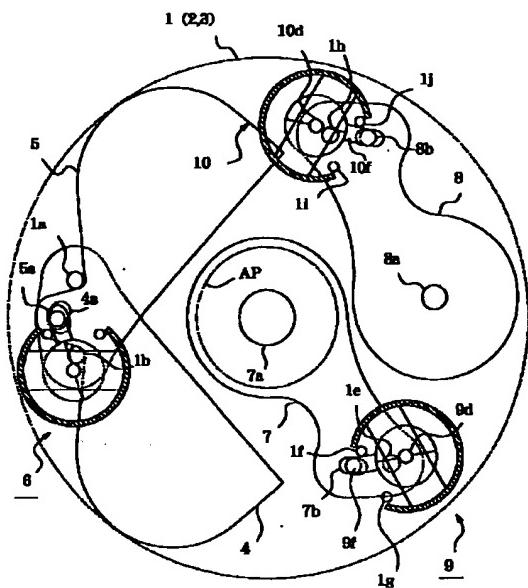
【図4】



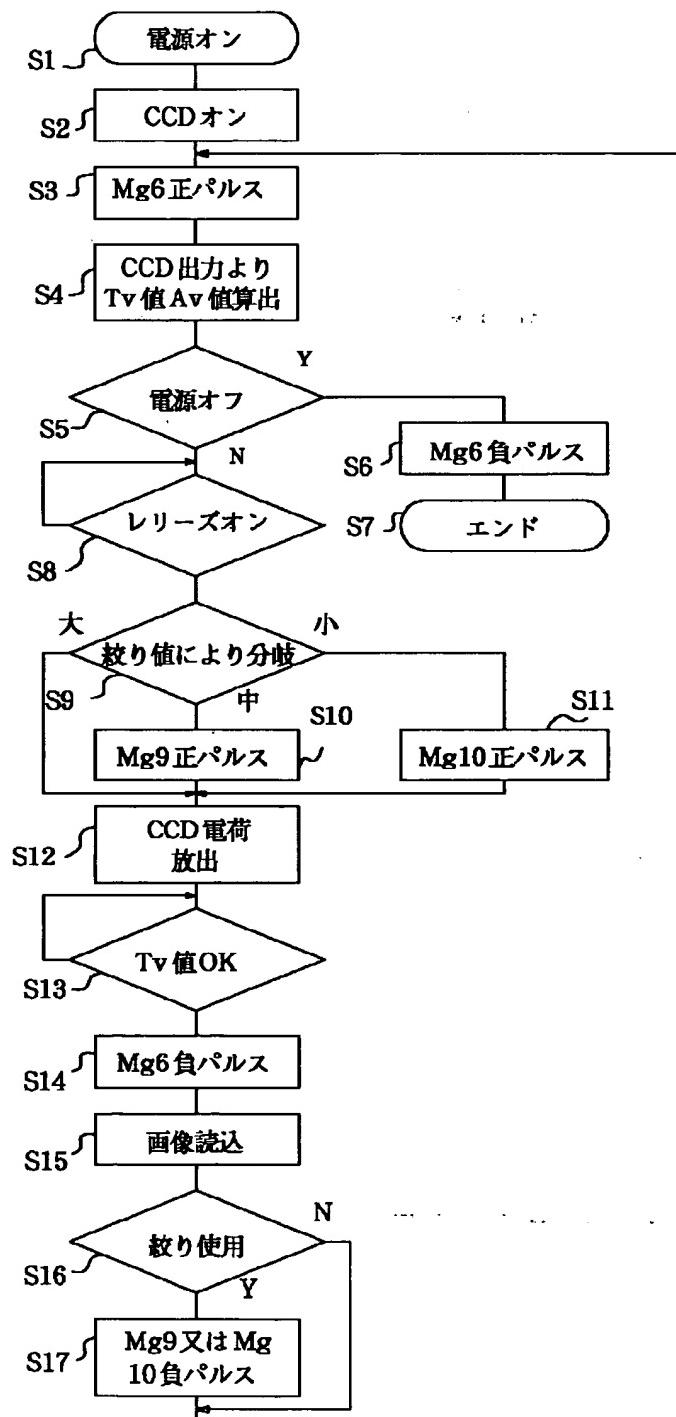
【図6】



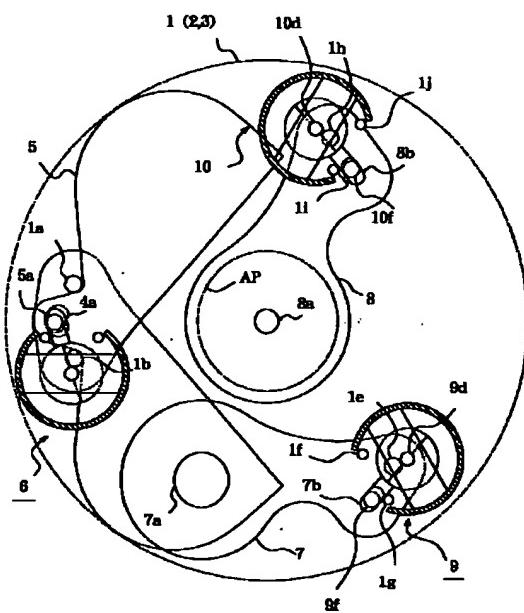
【図7】



【図5】



【図8】



(1)

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(54) IMAGE PICKUP UNIT

(57) Abstract:

PROBLEM TO BE SOLVED: To provide an image pickup unit excellent in the protective function of an imaging means, and which is small-sized, and whose power consumption is low, and which copes with the increase of the number of picture elements.

SOLUTION: Incident field light is image-formed on a specified image-formation surface by an image pickup optical system, and is photoelectrically converted and outputted by the image pickup means. This unit has blade members 4 and 5 arranged so as to be able to enter an image pickup optical path leading to the image pickup means from the image pickup optical system, and the blade members 4 and 5 are converted and driven between a first state where they are retracted to the outside of the image pickup optical path and a second state where they enter the inside of the image pickup optical path by a blade driving means 6. Since the blade driving means 6 is constituted of, for instance, a moving magnet, and is held in a non-energizing state by a holding means, for instance, in iron pin or the like, power consumption in accordance with holding is eliminated even though the blade members 4 and 5 are held at the most desirable position in accordance with a change in the state of a camera. Therefore, the power consumption is restrained even though the protection of the image pickup means and real

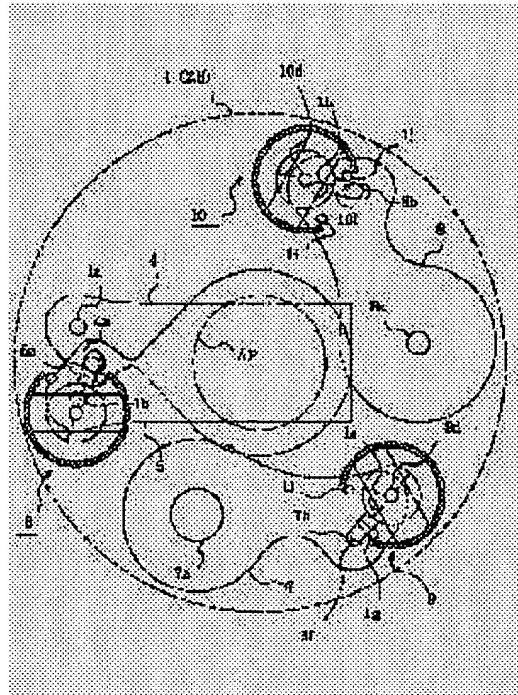


image display or the like for a liquid crystal finder are performed, and also the exposure is completed by the blade members 4 and 5, so that the unit copes with the increase of the number of the picture elements.

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[Date of final disposal for application]
[Patent number] 3205714
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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] About image pick-up equipment, this invention carries out photo electric conversion of the photographic subject image to details like the so-called electronic "still" camera more, and relates to static-image *** image pick-up equipment.

[0002]

[Description of the Prior Art] The image pick-up equipment which carries out photo electric conversion of the photographic subject image in recent years, and obtained the static image is spreading as one field of a still camera with the so-called film-based camera. Although what controlled the time of an exposure second by controlling the time amount of until off from ON of an image pick-up means as exposure control in this kind of image pick-up equipment is known, the problem that odd lines and the time gap at even lines arise under the effect of an interlace in photoing a dynamic photographic subject, and a notch arises [the appearance of a photographic subject] **s. Moreover, recently, in order to solve such a problem, the image sensor which enabled it to output a full frame image by the non-interlace is also spreading, but when the number of pixels is made [many] by the non-interlace, in order that the element itself may become very expensive and it may cover an image sensor from field light during taking in of image data, there is a request equipped with shutter equipment. Moreover, since exposure amendment in a processing laboratory cannot be expected like a silver salt film camera in the case of the so-called electronic camera of a still mold, or a digital camcorder but exposure tolerance is also narrower than a silver halide film, there is a request of wanting to control independently, at the time of a relative aperture and a shutter second. In the case of a silver salt film camera, what extracts an independent actuator and was made to serve a double purpose as a driving source of a wing and a shutter wing has spread widely. Generally, after it extracts such a device in the 1st step of actuation of an actuator, and it drives a device to the target location, extracts it according to the ratchet mechanism of a ratchet etc. and stops a device, it is made as [carry out / in the 2nd step of actuation of an actuator / the closing motion drive of the shutter style].

[0003]

[Problem(s) to be Solved by the Invention] however, the so-called electronic "still" camera, since image sensor area is alike and narrower than silver halide films, such as a common 35mm film and a new rank film While the perimeter of a lens barrel is miniaturized, the request of a lens aperture of wanting to maintain the diameter of macrostomia is strong, it is in the orientation which the mounting space of a wing drive narrow-izes, and an actuator independent as mentioned above is extracted. As a driving source of a device and a shutter style When making it serve a double purpose, in order also to have to establish the stop device and the stop discharge device which extract while the transfer system of power becomes complicated, and a device is stopped, there is also a problem that mounting becomes difficult.

[0004] In order to solve this problem, while forming the actuator which became independent to both the drawing device and the shutter style, it is effective to carry out the direct drive of each wing with each actuator. By the way, in the case of an electronic camera, in order to protect an image pick-up means

from field light at the time of un-using [of a camera] it Although there is a request of wanting to maintain a shutter in the state of opening in order to copy out a photographic subject image on monitoring devices, such as for example, a liquid crystal finder, at the time of the injection of a power supply, while the so-called normal close type which changes a ** shutter wing into a closing condition is desirable In order to maintain a shutter wing in a opening location at the time of the injection of a power supply, when current continues being supplied, the problem that consumption of a power supply is remarkable arises. Since power is especially consumed to a display, image recording, etc. of a finder in the case of an electronic camera while camera size is miniaturized as compared with a film-based camera, request of wanting to control consumption of a power supply as much as possible is strong. [0005]

[Means for Solving the Problem] This invention is made in view of such a trouble, and the shutter circumference can be miniaturized, and it aims at offering little image pick-up equipment of power consumption, enabling protection of an image sensor and a display of a liquid crystal finder. If it summarizes, image pick-up equipment concerning claim 1 of this invention according to photography optical system and :this photography optical system to which a predetermined image formation side is made to carry out image formation of the :incident light An image pick-up means arranged in an image formation side as for which incident light carries out image formation : by supplying a wing member and :drive power which have been arranged possible [penetration] into an image pick-up optical path from said photography optical system to said image pick-up means A wing driving means which drives said wing member between the 2nd condition of having advanced into the 1st condition of having shunted out of said image-pick-up optical path, and said image-pick-up optical path: Attain the above-mentioned purpose by providing a maintenance means and : which hold said wing driving means 2nd in the state of [said] said 1st condition in the state of un-energizing.

[0006] Image pick-up equipment concerning claim 2 consists of MUBINGU magnets which circle by angle within the limits predetermined in an outgoing end corresponding to the supply direction of current on the assumption that claim 1 for the :aforementioned wing driving means, and the :aforementioned maintenance means consists of ferromagnetics arranged at revolution ***** of said MUBINGU magnet.

[0007] Image pick-up equipment concerning claim 3 according to furthermore, photography optical system and :this photography optical system to which a predetermined image formation side is made to carry out image formation of the :incident light An image pick-up means arranged in an image formation side as for which incident light carries out image formation : by supplying 1, or two or more drawing wing members and :drive power which is arranged possible [penetration] and controls an aperture value into a photography optical path from said photography optical system to said image pick-up means Said drawing wing member A drawing wing driving means driven between the 2nd condition of having advanced into the 1st condition of having shunted out of said photography optical path, and said photography optical path : by supplying a shutter wing member and :drive power which are arranged possible [penetration], and open and close a photography optical path into a photography optical path from said photography optical system to said image pick-up means A shutter wing driving means which drives said shutter wing member between the 2nd condition of having advanced into the 1st condition of having shunted out of said photography optical path, and said photography optical path : by providing a maintenance means and : which hold each wing driving means of a wing 2nd in the state of [said] said 1st condition in the state of un-energizing The above-mentioned purpose is attained.

[0008] the image pick-up equipment concerning claim 4 -- a premise [claim / 3 / :] -- carrying out -- : -- the image pick-up equipment which considers as said image pick-up means, and is characterized by to provide the exposure control means which controls the time of an exposure second by controlling time amount until said shutter wing driving member drives said shutter wing member in said 2nd condition from said 1st condition after emitting the charge accumulated in :this charge-coupled device, while having a charge-coupled device.

[0009] Image pick-up equipment concerning claim 5 consists of MUBINGU magnets which circle by angle within the limits predetermined in an outgoing end corresponding to the supply direction of

current on the assumption that claim 3 or claim 4 for the aforementioned shutter wing driving means and said drawing wing driving means, and the aforementioned maintenance means consists of the magnetic substance arranged at revolution ***** of said MUBINGU magnet.

[0010] Namely, since it has a wing member arranged possible [penetration into an image pick-up optical path from photography optical system to an image sensor] according to this invention While protection of an image pick-up means at the time of un-using it is made, can also perform easily an increment in the number of pixels of an image pick-up means, and moreover, it sets at the time of un-energizing. Since a wing driving member is held by maintenance means after a ***** member has advanced into a condition which shunted out of a photography optical path, or a photography optical path, useless power consumption is controlled.

[0011]

[Embodiment of the Invention] With reference to a drawing, 1 operation gestalt of this invention is explained below. Drawing 1 is a plan in which the image pick-up equipment of this invention shows the condition that the power supply by the side of the main part of a camera turned off, and drawing 2 is the cross section showing the circumference of a MUBINGU magnet. One in drawing is a sheeting and a up cope plate and 2 show [an inside cope plate and 3] virtually the up cope plate 1, the inside cope plate 2, and the sheeting 3 with the same alternate long and short dash line in drawing 1. The exposure opening AP which forms an image pick-up optical path is formed in a part for the center section of these cope plates. 4 and 5 are shutter wings which open and close the exposure opening AP, and the shutter wings 4 and 5 are respectively supported free [rocking] to the pins 1a and 1b implanted in the rear face of the up cope plate 1. In addition, it does not have an aperture formation edge but the shutter wings 4 and 5 shown in this example have it in the condition of having covered the exposure opening AP at the time of un-using it.

[0012] Next, 6 is a MUBINGU magnet for carrying out the closing motion drive of the shutter wings 4 and 5, and drawing 2 expands the plane where drawing 3 shows a cross section to drawing 1, and shows it respectively. In addition, although not shown especially in drawing 1, the sign of the component of the MUBINGU magnet 6 will be understood if drawing 2 and drawing 3 are referred to. Coil frame 6b has fixed the MUBINGU magnet 6 to the inside distance of cylinder-like casing 6a, and as shown in drawing 3 along with the longitudinal direction of coil frame 6b, coil 6c is coiled. Magnet 6e of two poles is supported pivotable by 6d of shafts established inside coil frame 6b, and it is engaging with the long holes 4a and 5a (refer to drawing 1) which penetrated the up cope plate 1 and the inside cope plate 2, and were respectively formed in the shutter wings 4 and 5 respectively output pin 6f projected and formed in the outside of magnet 6e.

[0013] The actuation range of output pin 6f is regulated by the pins 1c and 1d which were implanted in the up cope plate 1 and which were formed, for example with ferromagnetics, such as iron. Although held in the initial state in the condition which ** arrival of the pin 1c is carried out output pin 6f, and shows in drawing 1 or drawing 3, if positive pulse current is supplied to coil 6c in this condition, the magnetic field from which the bottom becomes N pole in drawing 3 will be formed around coil frame 6b, magnet 6e rotates the circumference of an anti-clock centering on 6d of shafts, and output pin 6f stops it in contact with pin 1d. And output pin 6f, since ** arrival of the pin 1d is carried out output pin 6f, even if it intercepts supply of positive pulse current, where ** arrival of the pin 1d is carried out, it is held. Moreover, since the magnetic field from which the bottom becomes N pole in drawing 3 will be formed around coil frame 6b if output pin 6f supplies negative pulse current to coil 6c from the condition which carried out ** arrival of the pin 1d, magnet 6e rotates the circumference of a clock centering on 6d of shafts, and output pin 6f stops it in contact with pin 1c. And output pin 6f, since ** arrival of the pin 1c is carried out output pin 6f, even if it intercepts supply of negative pulse current, where ** arrival of the pin 1c is carried out, it is held.

[0014] This operation gestalt assumes what was made to perform three kinds of aperture control of the Onaka smallness, and the full open condition of the exposure opening AP is equivalent to the diameter of macrostomia. Moreover, the diameter of Nakaguchi and the diameter of a small sum have obtained the drawing wing 7 or 8 by making the exposure opening AP advance respectively. First, it is supported

by pin by which wing 7 was implanted in up cope plate 1 by extracting 1 corresponding to diameter of Nakaguchi e free [rocking], and opening 7a equivalent to the diameter of Nakaguchi is formed in a part for the point of the drawing wing 7. Moreover, 9 is a MUBINGU magnet used as the driving source for making it circle in the drawing wing 7, and the configuration of the MUBINGU magnet 9 is engaging with long hole 7b which it is fundamentally [as the already explained MUBINGU magnet 6] the same, and output pin 9f extracted, and was formed in the wing 7. In addition, in this operation gestalt, the MUBINGU magnet 9 rotates to the circumference of a clock centering on 9d of shafts until output pin 9f contacts pin 1f of a ferromagnetic by supplying positive pulse current, and it rotates to the circumference of an anti-clock centering on 9d of shafts until it contacts pin 1g of a ferromagnetic by supplying negative pulse current. Moreover, as for opening 7a formed in the drawing wing 7, opening 7a and the exposure opening AP become a concentric circle in general in the condition that output pin 9f of the MUBINGU magnet 9 contacted pin 1f.

[0015] Next, it is supported free [rocking] by pin by which wing 8 was implanted in up cope plate 1 by extracting 1h corresponding to the diameter of a small sum, and opening 8a equivalent to the diameter of a small sum is formed in a part for the point of the drawing wing 8. Moreover, 10 is a MUBINGU magnet used as the driving source for making it circle in the drawing wing 8, and is engaging with long hole 8b which the same is fundamentally [as the already explained MUBINGU magnet 6] said of the configuration of the MUBINGU magnet 10, and output pin 10f extracted, and was formed in the wing 8. In addition, in this operation gestalt, the MUBINGU magnet 10 rotates to the circumference of a clock centering on 10d of shafts until output pin 10f contacts pin 1i of a ferromagnetic by supplying positive pulse current, and it rotates to the circumference of an anti-clock centering on 10d of shafts until it contacts pin 1j of a ferromagnetic by supplying negative pulse current. Moreover, as for opening 8a formed in the drawing wing 8, opening 8a and the exposure opening AP become a concentric circle in general in the condition that output pin 10f of the MUBINGU magnet 10 contacted pin 1i.

[0016] Next, drawing 4 is the block diagram of the control system of this operation gestalt, 4 and 5 show the shutter wings 4 and 5 as stated above, 7 and 8 show the drawing wings 7 and 8 as stated above, and 6, 9, and 10 show respectively the MUBINGU magnets 6, 9, and 10 as stated above. A main switch and 16 a shutter release switch and 15 for the picture signal processing circuit where the lens for photography in 11 and 12 perform storage processing of a picture signal in which the image pick-up means slack CCD and 13 were outputted from CCD12 etc., and 14 moreover, a microcomputer It is shown respectively and the shutter drive circuit which supplies a driving signal to the MUBINGU magnet 6 for a shutter drive in 17, the drawing drive circuit which 18 extracts and supplies a driving signal to the MUBINGU magnet 9 and the MUBINGU magnet 10 for a drive, and 19 the charge storage of CCD12, and charge emission The electronic shutter control circuit to control is shown respectively.

[0017] Next, actuation of this operation gestalt is explained to details with reference to the plan showing the change of state of the above-mentioned matter, the flow chart of drawing 5, the timing diagram of drawing 6, drawing 7, and drawing 8. First, in an initial state, a device is in the condition which shows in drawing 1. When a main switch 15 turns on, a program is started, and a microcomputer 16 controls the shutter drive circuit 17, and makes positive pulse current supply to the MUBINGU magnet 6 while it controls the electronic shutter control circuit 19 and carries out actuation initiation of CCD12. (Steps S2 and S3)

[0018] It rotates to the circumference of an anti-clock until it contacts pin 1d centering on 6d of shafts output pin 6f by supplying positive pulse current to the MUBINGU magnet 6. And since ** arrival of the pin 1d will be carried out output pin 6f if output pin 6f contacts pin 1d, an output pin 6f location is held also in the state of un-energizing, after positive pulse current falls. Thus, if output pin 6f rotates to the circumference of an anti-clock from the condition shown in drawing 1, since long holes 4a and 5a will be engaged respectively pin 6f, in the shutter wing 4, the shutter wing 5 levorotation-carries out [center / a / shaft 1/ dextrorotation-] the opening of the exposure opening AP a center [shaft 1b]. In addition, drawing 7 and drawing 8 show the condition that the shutter wings 4 and 5 carried out the opening of the exposure opening AP.

[0019] Now, since CCD12 has already started actuation, if the shutter wings 4 and 5 carry out the

opening of the exposure opening AP as mentioned above and CCD12 is exposed by field light, the output of CCD12 will be applied to a microcomputer 16. And it waits for a microcomputer 16 to measure field brightness, to compute the time of a proper drawing value and a shutter second, and for the release switch 14 to turn it on with the output of CCD12, (step S4). And if the release switch 14 turns on, processing will be branched according to the drawing value computed by step S4 (step S9). [0020] When the drawing value used is inside drawing, a microcomputer 16 is extracted, the drive circuit 18 is controlled, positive pulse current is supplied to the MUBINGU magnet 9 (step S10), and as for the MUBINGU magnet 9, output pin 9f holds a dextrorotation location also in the state of un-energizing [to which positive pulse current fell since the dextrorotation was carried out and ** arrival of the pin 1f was carried out until it contacted pin 1f centering on 9d of shafts]. And it extracts with dextrorotation actuation of the MUBINGU magnet 9, and opening 7a dextrorotation-narrows down the exposure opening AP also for a wing 7 to inside drawing focusing on shaft 1e. In addition, drawing 7 shows the condition that carried out in this way and opening 7a narrowed down the exposure opening AP to inside drawing. Moreover, when the drawing value used is small drawing, a microcomputer 16 is extracted, the drive circuit 18 is controlled, positive pulse current is supplied to the MUBINGU magnet 10 (step S11), and as for the MUBINGU magnet 10, output pin 10f holds a dextrorotation location also in the state of un-energizing [to which positive pulse current fell since the dextrorotation was carried out and ** arrival of the pin 1i was carried out until it contacted pin 1i centering on 10d of shafts]. And it extracts with dextrorotation actuation of the MUBINGU magnet 10, and opening 8a dextrorotation-narrows down the exposure opening AP also for a wing 8 to small drawing centering on 1h of shafts. In addition, drawing 8 shows the condition that carried out in this way and opening 8a narrowed down the exposure opening AP to small drawing. Furthermore, when the drawing value used is large drawing, narrowing-down actuation of aperture is not made but shifts to step S12 immediately. That is, in this case, the aperture of the exposure opening AP remains as it is, and becomes a drawing value.

[0021] Thus, when an aperture value becomes settled, a microcomputer 16 controls the electronic shutter control circuit 19, and makes the stored charge of CCD12 emit (step S12). And CCD12 starts are recording of a charge again from the time of discharge actuation being completed, therefore this timing turns into initiation timing at the time of an effective exposure second. Since it is already computed by step S4 at the time of a proper exposure second, if the time of the exposure second computed by step S4 passes after emitting the stored charge of CCD12 at step S12, a microcomputer 16 will control the shutter drive circuit 17, and will supply negative pulse current to the MUBINGU magnet 6 (step S14). It rotates to the circumference of a clock until it contacts pin 1c centering on 6d of shafts output pin 6f by supplying negative pulse current to the MUBINGU magnet 6. And since ** arrival of the pin 1c will be carried out output pin 6f if output pin 6f contacts pin 1c, an output pin 6f location is held also in the state of un-energizing, after negative pulse current falls. Thus, if output pin 6f rotates to the circumference of a clock from the condition shown in drawing 7 or drawing 8, while the shutter wing 4 carries out the levorotation a center [shaft 1a], the shutter wing 5 will dextrorotation-cover the exposure opening AP focusing on shaft 1b. Therefore, in the diameter photography of macrostomia in which the diameter of a opening becomes settled in the exposure opening AP, the sum total area of the hatching portion ABC in drawing 6 corresponds at an effective exposure, and, in the diameter photography of Nakaguchi which the diameter of a opening extracts and becomes settled in opening 7a of a wing 7, the sum total area of the hatching portion BC in drawing 6 corresponds at an effective exposure. In the diameter photography of a small sum which the diameter of a opening extracts and becomes settled in opening 8a of a wing 8, the area of the hatching portion C in drawing 6 will correspond at an effective exposure.

[0022] Thus, if the shutter wings 4 and 5 cover the exposure opening AP, a microcomputer 16 controls the picture signal processing circuit 13, the output of CCD12 is made to incorporate (step S15), and the picture signal processing circuit 13 will write a picture signal in storage, such as an external memory card, and will complete one photography actuation. Thus, if one photography actuation is completed, photography of the following piece will be equipped with a microcomputer 16 as follows. That is, it distinguishes whether the microcomputer 16 was extracted at step S16, and used a wing 7 or 8. and -- if the drawing wing 7 is used -- the MUBINGU magnet 9 -- moreover -- if the drawing wing 8 is used --

pulse current each negative to the MUBINGU magnet 10 -- in addition, after making it return to the initial state which shows the drawing wing 7 or the drawing wing 8 to each drawing 1, it stands by that return to (step S17) and step S3, carry out the opening of the shutter wings 4 and 5, and the release switch 14 turns on at step S8. In addition, it cannot be overemphasized that the condition of drawing 1 is held also even for after a halt of pulse current negative in the MUBINGU magnet 9 or 10 by ***** between the output pins 9f and 10f and Pins 1g and 1j. Moreover, if what the electric power switch 15 turned off is detected at step S5 while standing by that carry out in this way and the release switch 14 turns on, the shutter drive circuit 17 will be controlled by step S6, negative pulse current will be added to the MUBINGU magnet 6, the close chain drive of the shutter wings 4 and 5 is carried out, and exposure actuation is ended. In addition, from capacity circuits, such as a capacitor for example, outside drawing, current supply of the control action after an electric power switch 15 turns off is carried out, and it is performed.

[0023] In addition, although the example which applied this invention was shown in the camera which extracts as a shutter wing above and is equipped with the both sides of a wing independently, the thought of this invention can also be applied respectively independently to the drive of a drawing wing, or the drive of a shutter wing.

[0024]

[Effect of the Invention] Since the power consumption under maintenance actuation does not arise according to this invention like also when holding a wing member in the 1st condition explained above of having shunted out of the image pick-up optical path, and also when holding in the 2nd condition of having advanced into the image pick-up optical path By holding a wing member in the 1st condition in the condition of standing by aiming at protection of an image pick-up means, and a release switch being operated by power supply ON by holding a wing member in the 2nd condition at the time of OFF of a power supply Since exposure actuation can be ended by shading an image pick-up optical path for use of a liquid crystal finder etc. structural nothing and by driving a wing member in the 2nd condition from the 1st condition further as it is possible, it can respond also to increase of the number of pixels effectively. And since the power consumption accompanying this wing drive does not have the power consumption for the maintenance actuation only in the time of reversing a wing location, in image pick-up equipment, power consumption can be decreased as a whole to the big electronic "still" camera of power consumption, such as a liquid crystal finder drive and a store of image data, etc., and the number of photography coma can be increased.

[Translation done.]

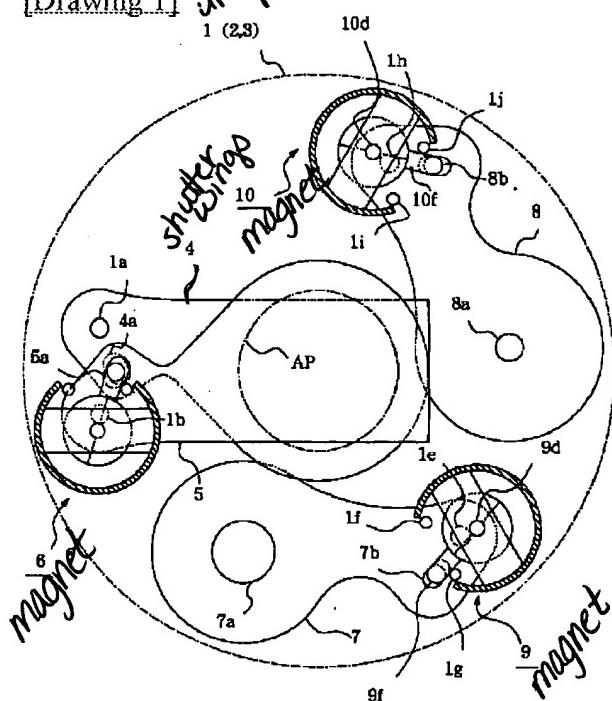
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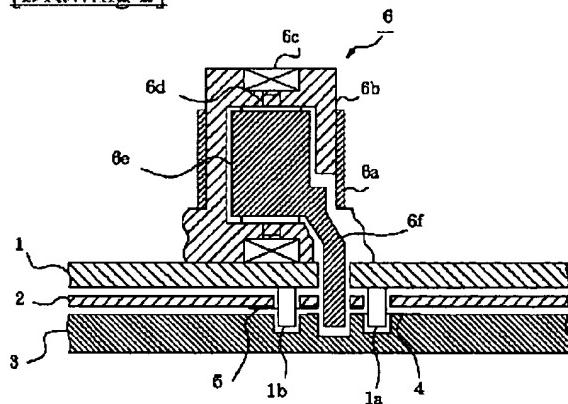
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DRAWINGS

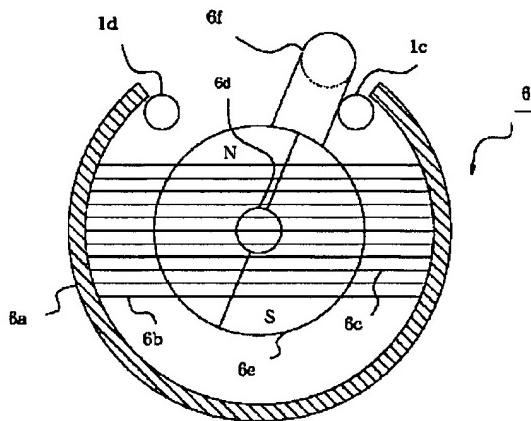
[Drawing 1] up cope plate



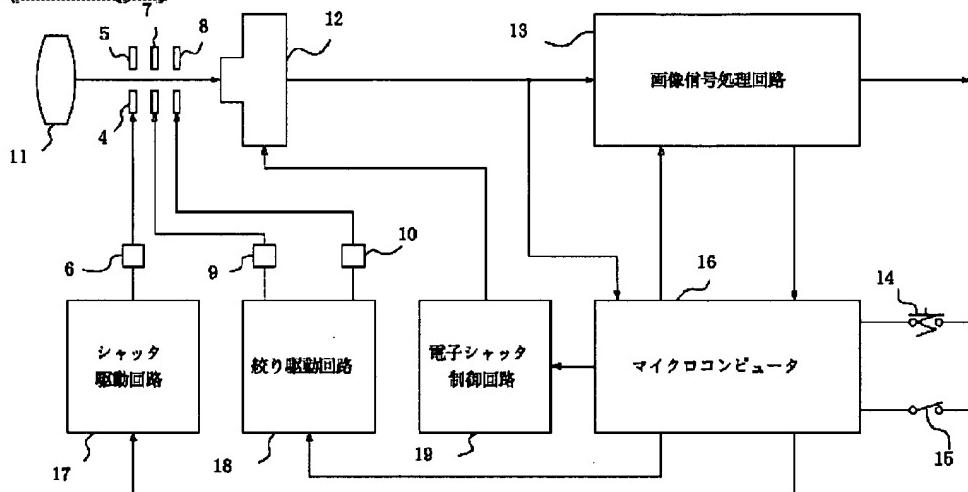
[Drawing 2]



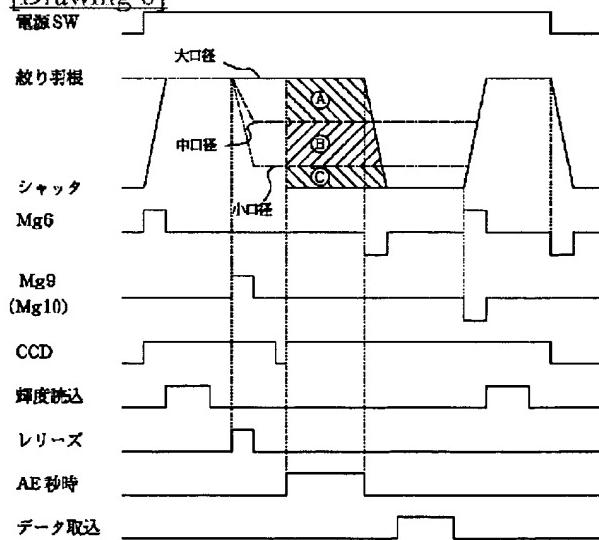
[Drawing 3]



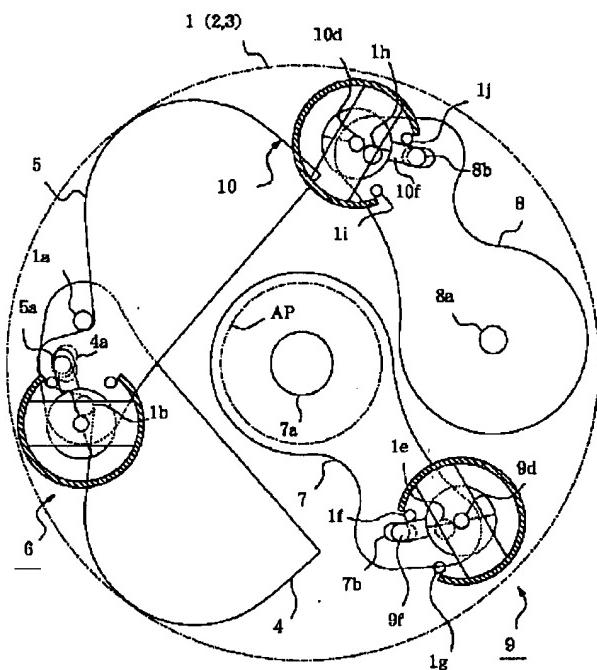
[Drawing 4]



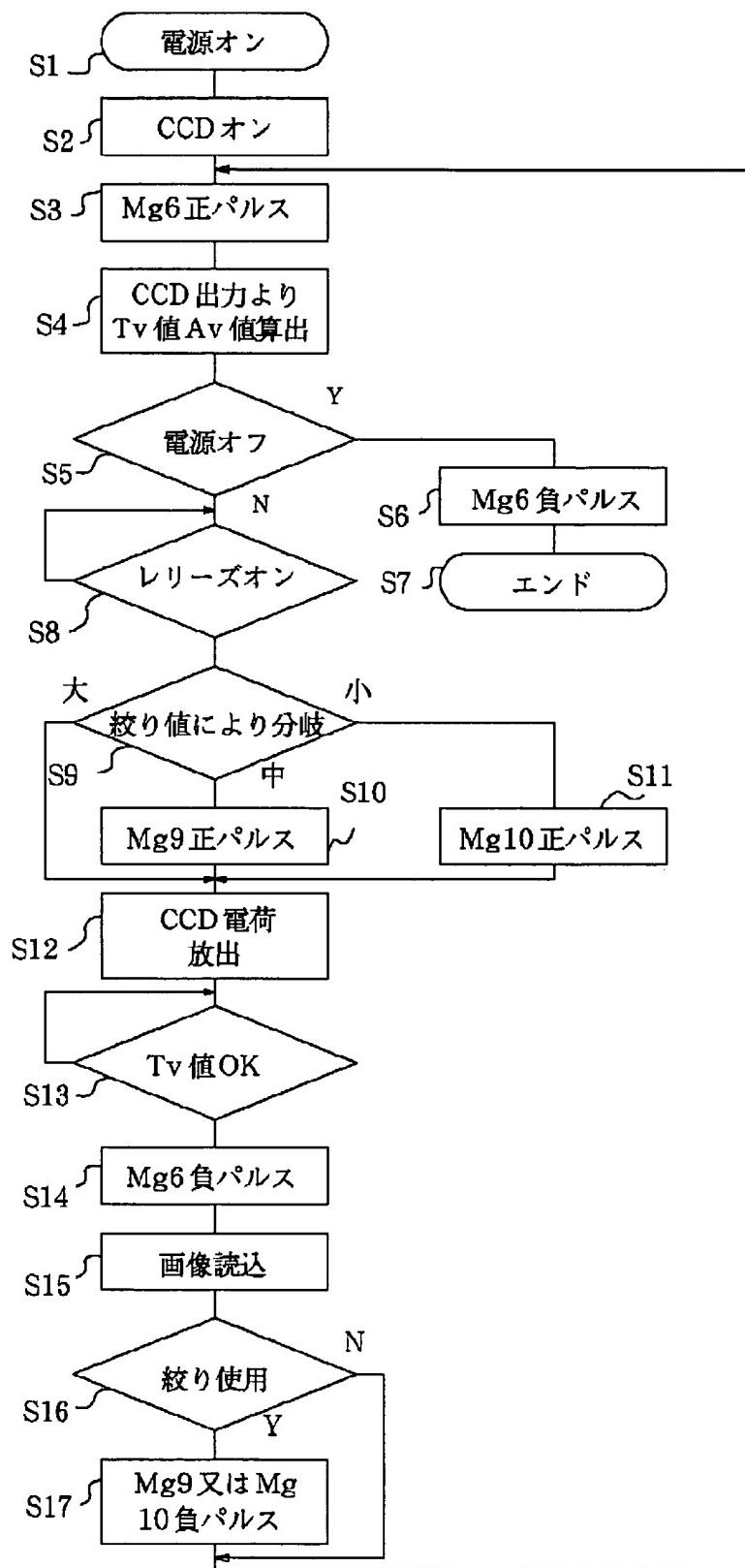
[Drawing 6]



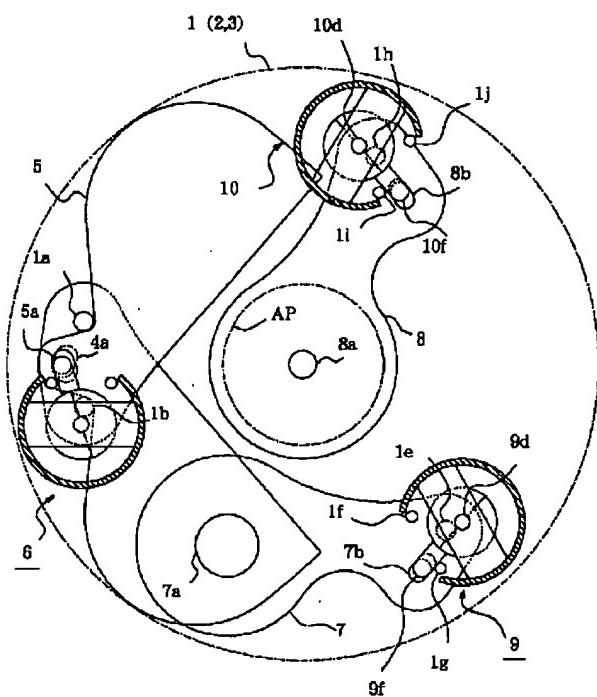
[Drawing 7]



[Drawing 5]



[Drawing 8]



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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The plan in the initial state of the image pick-up equipment concerning the example of this invention.

[Drawing 2] The cross section of the MUBINGU magnet 6 shown in drawing 1.

[Drawing 3] The expansion plan of the MUBINGU magnet 6 shown in drawing 1.

[Drawing 4] The block diagram of the control system of the image pick-up equipment concerning the example of this invention.

[Drawing 5] The control action **** flow chart of the control system shown in drawing 4.

[Drawing 6] The timing diagram which shows the timing of the control system shown in drawing 4 of operation.

[Drawing 7] The plan which changed into the inside drawing condition the example shown in drawing 1.

[Drawing 8] The plan which changed into the small drawing condition the example shown in drawing 1.

[Description of Notations]

1 Up Cope Plate

1c, 1d, 1f, 1g, 1i, 1j Pin

4 Five Shutter wing

6 MUBINGU Magnet

6f Output pin

7 Drawing Wing for Inside Drawing

7a Opening

8 Drawing Wing for Small Drawing

8a Opening

9 MUBINGU Magnet

9f Output pin

10 MUBINGU Magnet

10f Output pin

11 Lens

12 CCD

16 Microcomputer

AP Exposure opening

[Translation done.]

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CLAIMS

[Claim(s)]

[Claim 1] Photography optical system to which a predetermined image formation side is made to carry out image formation of the incident light, and an image pick-up means arranged in an image formation side as for which incident light carries out image formation according to this photography optical system, A wing member arranged possible [penetration into an image pick-up optical path from said photography optical system to said image pick-up means], A wing driving means which drives said wing member by supplying drive power between the 2nd condition of having advanced into the 1st condition of having shunted out of said image pick-up optical path, and said image pick-up optical path, Image pick-up equipment characterized by providing a maintenance means to hold said wing driving means 2nd in the state of [said] said 1st condition in the state of un-energizing.

[Claim 2] It is image pick-up equipment characterized by for said wing driving means consisting of MUBINGU magnets in which an outgoing end circles by predetermined angle within the limits corresponding to the supply direction of current in image pick-up equipment according to claim 1, and said maintenance means consisting of ferromagnetics arranged at revolution ***** of said MUBINGU magnet.

[Claim 3] Photography optical system to which a predetermined image formation side is made to carry out image formation of the incident light, and an image pick-up means arranged in an image formation side as for which incident light carries out image formation according to this photography optical system, 1 or two or more drawing wing members which are arranged possible [penetration into a photography optical path from said photography optical system to said image pick-up means], and control an aperture value, A drawing wing driving means which drives said drawing wing member by supplying drive power between the 2nd condition of having advanced into the 1st condition of having shunted out of said photography optical path, and said photography optical path, A shutter wing member which is arranged possible [penetration into a photography optical path from said photography optical system to said image pick-up means], and opens and closes a photography optical path, A shutter wing driving means which drives said shutter wing member by supplying drive power between the 2nd condition of having advanced into the 1st condition of having shunted out of said photography optical path, and said photography optical path, Image pick-up equipment characterized by providing a maintenance means to hold said each wing driving means of a wing 2nd in the state of [said] said 1st condition in the state of un-energizing.

[Claim 4] Image pick-up equipment characterized by providing an exposure control means which controls the time of an exposure second by controlling time amount until said shutter wing driving member drives said shutter wing member in said 2nd condition from said 1st condition after emitting a charge accumulated in this charge-coupled device in image pick-up equipment according to claim 3, while having a charge-coupled device as said image pick-up means.

[Claim 5] It is image pick-up equipment characterized by for said shutter wing driving means and said drawing wing driving means consisting of MUBINGU magnets in which an outgoing end circles by predetermined angle within the limits corresponding to the supply direction of current in image pick-up

equipment according to claim 3 or 4, and said maintenance means consisting of the magnetic substance arranged at revolution ***** of said MUBINGU magnet.

[Translation done.]